

### **REMARKS**

Claims 28-66 are pending in the application. By this Amendment, Claims 1-27 are canceled without prejudice or disclaimer of the subject matter contained therein, and Claims 28-66 are added. Favorable reconsideration is respectfully requested in light of the following Remarks.

1. The Office action rejects Claims 5, 8, 10, 15, 20, 24 and 29<sup>1</sup> under 35 U.S.C. 112, second paragraph. The rejection is respectfully traversed.

By this Amendment, Claims 5, 8, 10, 15, 20 and 24 are canceled, thereby rendering the rejection moot. Withdrawal of the rejection is respectfully requested.

2. The Office action rejects Claims 5, 8, 10, 15, 20, 24 and 29<sup>2</sup> under 35 U.S.C. 101. The rejection is respectfully traversed.

By this Amendment, Claims 5, 8, 10, 15, 20 and 24 are canceled, thereby rendering the rejection moot. Withdrawal of the rejection is respectfully requested.

3. The Office action rejects Claims 1-6, 12-14, 16-18, 22-24 and 26 under 35 U.S.C. 102(b) over Feldman (U.S. Patent Application Pub. No. 2003/0195831, hereinafter "Feldman"), and Claims 7, 8, 21, 25 and 27 under 35 U.S.C. 103(a) over Feldman in view of Iyer ("A Family of Dominance Filters for Multiple Criteria Decision Making; Choosing the Right Filter for a Decision Situation", by Naresh Iyer, dissertation, The Ohio State University, 2001, hereinafter "Iyer"), and Claims 9 and 15 under 35 U.S.C. 103(a) over Feldman in view of Neil Eklund's article ("Multiobjective Visible Spectrum Optimization: A Genetic Algorithm Approach", Rensselaer Polytechnic Institute, Volume 6311B, hereinafter "Eklund"), Claim 10 under 35 U.S.C. 103(a) over Feldman in view of Eklund and further in view of Iyer, and Claims 11, 19 and 20 under 35 U.S.C. 103(a) over Feldman in further in view of Arbel's article ("Using Efficient Anchoring Points for Generating Search Directions in Interior Multiobjective Linear Programming" by Ami Arbel, The Journal of Operational

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<sup>1</sup> Applicant assumes that Claim 29 is incorrect because only Claims 1-27 were pending.

Research Society, Vol. 45, No. 3, March 1994, pp 330-344, hereinafter “Arbel”), and Palacios-Gomez’s article (“Nonlinear Optimization by Successive Linear Programming”, F. Palacios-Gomez, Management Science, Vol. 28, No. 10, Oct. 1982, pp. 1106-1120, hereinafter “Palacios-Gomez”). The rejections are respectfully traversed.

By this Amendment, Claims 1-27 are canceled, thereby rendering the rejections moot. Withdrawal of the rejections is respectfully requested.

New independent Claim 28 specifies, inter alia, a method for multi-objective portfolio optimization, the method comprising the steps of:

- generating an initial population of solutions of portfolio allocations using a combination of linear programming and sequential linear programming algorithms in a portfolio configuration space using a computing device, the portfolio configuration space having a plurality of dimensions;

- generating a first interim efficient frontier in a portfolio performance space having at least three dimensions using a Pareto Sorting Evolutionary Algorithm (PSEA);

- generating a second interim efficient frontier in the portfolio performance space using a Target Objectives Genetic Algorithm (TOGA);

- concatenating the first interim efficient frontier with the second interim efficient frontier to create a third interim efficient frontier; and

- passing the third interim efficient frontier through a dominance filter to generate a final efficient frontier for use in investment decisions.

It is respectfully submitted that at least the steps of:

- generating a first interim efficient frontier in a portfolio performance space having at least three dimensions using a Pareto Sorting Evolutionary Algorithm (PSEA);

- generating a second interim efficient frontier in the portfolio performance space using a Target Objectives Genetic Algorithm (TOGA); and

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<sup>2</sup> Applicant assumes that Claim 29 is incorrect because only Claims 1-27 were pending.

concatenating the first interim efficient frontier with the second interim efficient frontier to create a third interim efficient frontier, are not disclosed, taught or suggested in the applied art, taken singly or in combination.

For at least this reason, Claim 28 is allowable over the applied art, taken singly or in combination. Claims 29-64, which depend from Claim 28, are likewise allowable over the applied art, taken singly or in combination.

New independent Claims 65 and 66 are directed to the system and computer readable medium having substantially the same features as independent method Claim 28. Thus, for the same reasons for Claim 28, Claims 65 and 66 are allowable over the applied art, taken singly or in combination.

New dependent Claims 29-45 are directed to the visualization and gap filling features of the claimed invention. Support for these features of the claimed invention can be found, for example, in Paragraphs [00190]-[00194] and Figures 2, 3, 8 and 12.

It is respectfully submitted that at least the feature of generating a non-dominated solution set comprising an efficient frontier in the portfolio performance space using one of an evolutionary algorithm and optimization processing, as recited in dependent Claim 29, is not disclosed, taught or suggested in the applied art, taken singly or in combination.

For at least this additional reason, Claims 29-40 are allowable over the applied art, taken singly or in combination.

In addition, it is respectfully submitted that at least the feature of interactively placing at least one target in the at least one region using a visualization tool, as recited in dependent Claim 41, is not disclosed, taught or suggested in the applied art, taken singly or in combination.

For at least this additional reason, Claims 41-45 are allowable over the applied art, taken singly or in combination.

New dependent Claims 46-55 are directed to evolutionary algorithms of the claimed invention. Support for this feature, and other features of Claims 46-55 can be found, for example, in Paragraphs [00114]-[00131] and Figures 3, 6 and 7.

It is respectfully submitted that at least the feature of randomly drawing an initial population of individual portfolio allocations that are generated from a portfolio allocations archive by using a combination of linear programming and sequential linear programming algorithms, in combination with the other features of Claim 46, are not disclosed, taught or suggested in the applied art.

For at least this reason, Claims 46-55 are allowable over the applied art, taken singly or in combination.

New dependent Claims 56-64 are directed to the fast dominance filtering feature of the claimed invention. Support for this feature of the claimed invention can be found, for example, in Paragraphs [00171]-[00186] and Figures 10 and 11.

It is respectfully submitted that there is no mention in the applied art of at least the steps of:

- (a) selecting a first dimension from the at least three dimensions of the portfolio performance space;
- (b) generating bins for all remaining non-selected dimensions of the portfolio performance space;
- (c) determining a solution in each bin of the non-selected dimensions with a maximum value along the selected dimension;
- (d) comparing the solution with the maximum value in each bin to other solutions in each bin to determine whether the other solutions are dominant solutions or dominated solutions; and
- (e) removing the dominated solutions from the portfolio performance space so as to result in a reduced set of solutions, the reduced set of solutions being used in investment decisions.

For at least this reason, Claims 56-64 are allowable over the applied art, taken singly or in combination.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is earnestly solicited.

Should Examiner Fertig believe anything further would be desirable in order to place the application in better condition for allowance, the Examiner is invited to contact the undersigned attorney at the telephone number listed below.

It is believed that any additional fees due with respect to this paper have already been identified. However, if any additional fees are required in connection with the filing of this paper, permission is given to charge account number 07-0868 in the name of General Electric Company.

6 August 2008

Respectfully submitted,

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